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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER

NGUYEN, NGOC YEN M

ART UNIT

PAPER NUMBER

1754

14

DATE MAILED: 06/14/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.		Applicant(s) AF 14	
	09/447,030		FORBERT ET AL.	
	Examiner		Art Unit	
	Ngoc-Yen M. Nguyen		1754	

-- Th MAILING DATE of this communication app ars on the cov r she t with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 11 February 2002.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 13-24 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 13-24 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ | 6) <input type="checkbox"/> Other: |

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DETAILED ACTION

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 14-24 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In claim 13, it is unclear what is required by "perceptibly". As defined by the American Heritage Dictionary, Second College Edition, "perceptibly" is "capable of being perceived", thus, it is unclear if the limitation of "perceptibly dissolves in the lyosol" requires that the vapor atmosphere has to dissolve in the lyosol or only appears to dissolve in the lyosol (but actually not dissolve).

If the phrase "does not perceptibly dissolve" has relative meaning, just as "soluble" (i.e. slightly soluble, very soluble, etc.), such phrase would render the claim indefinite. The phrase "does not perceptibly dissolve" is not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention. On page 4, second full paragraph, it is stated that air does not dissolve in the hydrosol, however, the instant specification, including the

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Example 1, does not clearly exemplify which vapor atmosphere does or does not perceptibly dissolve in the hydrosol.

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless --

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 13-14, 16-19 are rejected under 35 U.S.C. 102(b) as being anticipated by Bergna et al (4,131,542) with the Grant and Hackh's Chemical Dictionary and Chemical Engineer's Handbook to show inherent state of fact.

Bergna '542 discloses a process for making amorphous spheroidal silica grains which comprises the steps of:

- (a) spray drying with flowing air at a temperature from 130 to 400°C a silica sol;
- (b) sintering the porous micrograins to reduce the surface area thereof from 5% to 20% (note claim 1).

Bergna '542 further discloses that the feed in most cases is a silica aquasol (note column 5, lines 46-47). Bergna '542 also discloses that the manner in which spray contacts the drying air is an important factor in spray dryer design, as this has great bearing on dried product properties by influencing droplet behavior during drying. The spray can be directed into the hot air entering

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from the top of the drying chamber. Product and air pass through the drying in "co-current" flow, so called after the inlet-outlet layout for air, feed, and dried product (note column 7, lines 56-60). Alternatively, the spray can be contacted with air in "counter-current" flow. Spray and air enter at the opposite ends of the dryer. This arrangement offers dryer performance with excellent heat utilization (note column 8, lines 3-6). Fast heating of the droplets produces a dry skin of silica trapping water inside the hollow spheres (note column 8, lines 8-10). This silica is considered as a hydrogel (as Grant and Hackh's Chemical Dictionary defines "gel" as colloidal solution of a liquid in a solid).

When spray and air are contacted in counter current flow, either the spray or the air must be flowing against gravity. Thus, the claimed "moving medium flows substantially against the direction of the force of gravity" can be "at once envisaged" from the disclosure of Bergna '542. When the flow of air is fed from the bottom of the dryer, it goes against the direction of gravity and naturally its speed would diminish in the direction of flow.

From the Chemical Engineers' Handbook, for "countercurrent" spray dryer, hot air is introduced from the bottom and feed is sprayed from the top (note Figure 20-71(a)).

The process of Bergna '542 anticipates the claimed process.

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are

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such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103© and potential 35 U.S.C. 102(f) or (g) prior art under 35 U.S.C. 103(a).

Claims 13-14, 16-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bergna '542, with Grant and Hackh's Chemical Dictionary and optionally in view of Chemical Engineers' Handbook.

Bergna '542 discloses a process as stated above.

Chemical Engineers' Handbook can be applied to teach for countercurrent spray dryer, the hot air is conventionally introduced from the bottom.

The difference is Bergna '542 does not disclose how the lyosol is formed.

However, the method for making the starting material is given little weight absence a showing of criticality, as the starting material made by any process would be expected to perform the same function in the process. Moreover, the examiner takes Official Notice that it is known in

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the art to form silica sol by reacting sodium silicate with a mineral acid and using the product of one process as starting material for another process would have been within the skill of the skilled artisan, In re Kamlet 88 USPQ 106.

Claims 13-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Marisic (2,384,946) in view of Fernholz et al (3,939,199) and optionally further in view of Mielke et al (5,656,195).

Marisic '946 discloses a process of producing hydrogel pellets by continuously contacting within an enclosed mixing chamber such as an injector or nozzle mixer, streams of reactant solutions of such concentration and proportions that no gelation occurs within the mixer, but only at some predetermined time after leaving the mixer, and under such conditions of flow that each stream is completely and uniformly dispersed within and throughout the other at the instant of contact. The resultant colloidal solution is ejected from the mixer through an orifice or orifices of suitable size so as to form globules of the solution which are introduced into a fluid medium where the globules of the colloidal solution set to a gel before they pass out of the medium (note page 2, lines 48-64). The fluid medium can be constituted of a gas such as air (note sentence bridging the 2 columns on page 2).

Marisic '946 further disclose that the medium may contain components which can be dissolved therefrom by the hydrosol (note page 1, left column, lines 17-18).

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Marisic '946 discloses that the hydrogel can be produced from a solution of sodium silicate and hydrochloric acid (note Example III).

It would have been obvious to one skilled in the art to select any embodiment among the specifically disclosed embodiments, *Merck & Co. Inc. v. Biocraft Laboratory Inc.* 10 USPQ 1846.

Marisic '946 discloses that the apparatus can be adapted for upward flow of the colloidal solution during gelation (note page 3, right column, lines 67-70). Marisic '946 further discloses that the fluid medium is maintained at a temperature below the boiling point of said sol. After setting is complete, the hydrogen may be washed, base exchanged, heat treated or otherwise processed to obtain the desired physical and chemical characteristics in the final product (note page 2, right column, lines 14-40).

Marisic does not specifically disclose the temperature of the process, however, it would have been obvious to optimize these process conditions to obtain the best results. It would also have been obvious to dry the hydrogel to obtain aerogel since aerogel is desired in the art. For the step of converting the hydrogel to aerogel, in the event that the above heat treating step of Marisic '946 is not sufficient to convert the hydrogel to aerogel, Mielke '195 can be applied as stated below.

Mielke '195 teaches that silica aerogel particles are desired to be used in moldings (note claim 1). Mielke '195 further discloses that silica aerogel can be produced by solvent exchange, and subsequent supercritical drying a silica hydrogel.

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Thus, it would have been obvious to one of ordinary skill in the art to convert the hydrogel of Marisic to aerogel because aerogel is desired to be used in moldings as suggested by Mielke '195.

The difference is Marisic 946 does not disclose that the fluid is moving substantially against the direction of gravity.

Fernholz '199 discloses that for a spray-drying process for converting a sol to a gel, in order to avoid damage of the gelled and still soft particles, they can be sprayed in upward inclined direction and collected in a liquid bath (for example water) or they can be conducted in countercurrent flow with a current of air or gas which reduces their impact velocity and simultaneously improves their resistance by drying. In this manner particles of almost any desired size can be produced (note column 2, lines 23-33).

It would have been obvious to one of ordinary skill in the art at the time of the invention was made to use a current of air or gas in countercurrent flow with the spray of silica sol in the process of Marisic '946, as suggested by Fernholz '199 because such countercurrent flow of air would reduce the silica gels impact velocity and improve their resistance by drying.

For claim 20, the subject matter as a whole would have been obvious to one having ordinary skill in the art at the time the invention was made to have used both the water bath and the countercurrent flow of air to avoid damage of the gelled and still soft particles, because combining two or more ways as disclosed in Fernholz '199 for the same purpose has been held to be a prima facie case of obviousness, see *In re Kerkhoven*, 205 USPQ 1069.

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Applicant's arguments filed February 11, 2002 have been fully considered but they are not persuasive.

Applicants argue that the terms "perceptibly" and "perceptibly dissolves" meet the definiteness requirement of 35 USC 112. Applicants cited Singer (4,420,441) as evidence.

In Singer '441, the terms "perceptible dissolution" and "perceptibly dissolved" are exemplified as "sharp edged chilled iron particles may be dispersed in a aluminum matrix, not only with their sharpness preserved, but also such that analysis of the matrix near the particles will fail to detect any significant quantity of intermetallic Al/Fe compound" (note column 1, lines 15-21), i.e., by looking the sharpness of the chilled iron particles and the composition of the matrix near the particles, one skilled in the art would be able to determine whether the particles were "perceptibly dissolved". However, in Applicants' specification, there is no explanation or example for "perceptible dissolves", as a matter of fact, the term "perceptibly" was not used in Applicants' specification. Thus, it is unclear how one skilled in the art can determine which medium would "perceptible dissolve" and which would not.

Applicants argue that in Bergna et al. process, a sol is spray dried to achieve rapid drying so as to avoid any substantial increase in viscosity due to gelling.

Granted that Bergna teaches that the spray drying is carried out before gelling, as stated in the above rejection, the product is silica with trapping water in a hollow sphere (note column 8, lines 8-11 and Figure 1). This product would meet the definition of a gel. It should also be noted that in Applicants' process, the lyosol is sprayed into the moving air (note Applicants' claim 17),

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just as in the process of Bergna. In general, in order to spray the lyosol, its viscosity should be kept low otherwise it will set into a big mass of gel and cannot be sprayed. Thus, the teaching of spraying drying before gelling for the process of Bergna does not in any way teaches that the product obtained after the spray drying cannot be a gel.

Applicants argue that Bergna does not disclose how its lyosol is formed and there is no disclosure in Bergna that the medium used for spray drying does not perceptibly dissolve in the sol.

For the 102 rejection, all claims rejected under this ground do not require the step of forming lyosol and for the limitation "does not perceptibly dissolve", as far as this can be understood, air is disclosed in Applicants' specification as "does not noticeably dissolve in the hydrosol", thus, air is considered as "does not perceptibly dissolve" and in Bergna '542, air is used (note claim 1, step a).

The rejection of claims 13-14, 16-22 under 103 rejection over Bergna 542 is maintained for the same reasons as stated above.

Applicants argue that Marisic teaches that it is essential that the sol be not mechanically disturbed during the time of setting.

Marisic '946 teaches that pellets may be formed by a process analogous to spray drying wherein the gelable solution is sprayed into a drying tower and the fluid medium may also be constituted of a gas such as air. Marisic '946 further teaches that whether the fluid medium be

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gaseous or liquid, it is essential to the formation of structurally strong pellet that the sol be not mechanically disturbed during the time of setting (note page 2, left column, line 68 to right column, line 5). Thus, the contact between the fluid medium (which can be gaseous) and the globules of the solution is *not* considered as a mechanical disturbance.

Applicants argue that the fluid medium most of Marisic's tank 11 does not flow substantially against the direction of the force of gravity (citing page 2, right column, lines 41-56).

It should be noted that right column, lines 41-56 describe two alternative methods of *liquid* phase operation, not gaseous phase. Fernholz '199 is applied as stated above to teach the desire to spray the solution to be gelled in an upward inclined direction.

Applicants argue that Fernholz does not teach or suggest mixing the gel forming components to produce a lyosol and introducing the lyosol into a moving medium which flows substantially against the direction of the force of gravity.

Fernholz is not relied to teach the step of producing lyosol. Marisic fairly teaches such step. Fernholz is applied to teach that in a spray-drying process for converting a sol to a gel, in order to avoid damage of the gelled and still soft particles, they can be sprayed in upward inclined direction, i.e., against the direction of the force of gravity, as required in Applicants' claims.

Applicants argue that Mielke does not teach the step of introducing a lyosol into a moving medium which does not perceptibly dissolve the lyosol.

Mielke is not relied upon to teach such step. Mielke is only applied to teach that the silica hydrogel can be used to produce silica aerogel.

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Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Examiner Ngoc-Yen Nguyen whose telephone number is (703) 308-2536. The examiner is currently on a part time schedule.


If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mr. Stanley Silverman, can be reached on (703) 308-3837. The fax phone number for this Group

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is (703) 872-9311 (for OFFICIAL After Final amendment only) or (703) 872-9310 (for all other OFFICIAL faxes). UNOFFICIAL fax can be sent to (703) 305-6078.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Group receptionist whose telephone number is (703) 308-0661.

N. M. Nguyen
June 13, 2002


N. M. Nguyen
Primary Examiner
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